

Erosion and Landslides

Lab Instructions

Erosion on Earth occurs due to many forces, including wind, glaciers, water and gravity. Most of the time, erosion is a slow, gradual process. However, one of the most dramatic and sudden forms of erosion are landslides, which can occur in all 50 states and all over the world. The slope of the surface, the amount of moisture in the soil, and rainfall are three of the major factors that affect when and where a landslide may occur.

Objective

Students will develop and test a hypothesis about how much added precipitation is necessary to cause a landslide in different types of sand and soil.

Materials

- Tray/stream table (for example, an empty half gallon milk carton with one side cut open and a hole in the bottom to let water drain)
- Larger tray or plastic bin to hold the water
- Spray bottle
- Wooden block or other way to prop up the tray
- Scale (to weigh water used) or a graduated cylinder (to measure volume of water used)
- Two different types of soil, sand and/or gravel

Procedure

1. Fill the carton with very moist sand/soil until it's about a centimeter deep (about one cup for a half-gallon carton). Make sure you use the same amount as the other groups. Lightly pack the sand/soil.
2. Prop the carton up with the wooden block. Make sure your angle is consistent with the other groups (use the same length piece of wood). Place the whole setup inside a larger plastic bin or tray to catch the water.
3. If you're using the scale, weigh the filled water bottle to get a starting value. If you're using the graduated cylinder, measure out a given amount of liquid and pour into the spray bottle and note how much water you started with.
4. Aim at the sand/soil at the top of the tray and start spraying with water from the spray bottle. Count how many sprays it takes until you first see movement of the sand/soil. Keep spraying (and counting) until you get a landslide, defined as when the top of the sand/soil slides past the mark two centimeters from the top of the carton.
5. If you're using the scale, weigh the water bottle to find an ending value. If you're using the graduated cylinder, pour the water into the cylinder and get a reading for the ending value.



Global Precipitation Measurement Mission

Name: _____

Date: _____

Period: _____

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Objective

Students will develop and test a hypothesis about how much added precipitation is necessary to cause a landslide in different types of sand and soil.

Problem (written as a question that will be answered by completing the investigation)

How much precipitation will cause a landslide in different types of sand or soil?

Independent Variable (the factor that is intentionally changed in an investigation)

This investigation is designed to see if different types of sand or soil, the independent variable, will have any impact on the amount of precipitation that causes a landslide.

Dependent Variable (the factor that changes as a result of the independent variable; it is what is measured to determine if the independent variable has the expected effect)

The dependent variable, amount of precipitation causing a landslide, is measured by number of sprays, as well as by volume of water, and may be different for the different sand/soils.

Hypothesis (should be written in If [independent variable], then [dependent variable] format and should answer the question posed as the problem)

*If sand/soil of different types is sprayed with water from a spray bottle, then the _____
independent variable dependent variable
needed to cause a landslide will be greatest for _____ and least for _____.
type of sand/soil type of sand/soil*

Data: My group's sand/soil type: _____

of sprays of water to first movement: _____ # of sprays of water to landslide: _____

<u>If using a scale:</u>	
Starting weight of water bottle:	_____ grams
Ending weight of water bottle:	_____ grams
Subtract to get:	
Water added to soil:	_____ grams
Convert to mL:	_____ mL
(1 mL of water weighs 1 gram)	

<u>If using a graduated cylinder:</u>	
Starting volume of water:	_____ mL
Ending volume of water:	_____ mL
Subtract to get:	
Water added to soil:	_____ mL

After the class shares their results: Was your hypothesis supported by the data? Explain. _____

